

Abstract

A projection optical system comprises a plurality of lenses
5 disposed along an optical axis of the projection optical system;
wherein the plurality of lenses is dividable into four non-
overlapping groups of lenses of positive and negative refractive
powers, wherein the following relation is fulfilled:

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$$2 \cdot y \cdot NA \cdot \frac{1}{k} \cdot \sum_{i=1}^k |\phi_i| \geq V_1$$

wherein:

15 y is half a diameter in mm of a maximum image field imaged by
the projection optical system,

NA is a maximum numerical aperture on a side of the second
object,

20 ϕ_i is a refractive power in mm^{-1} of the i^{th} lens,

k is a total number of lenses of the projection optical system,

and wherein V_1 is greater than 0.045.

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